REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

I. Introduction

Claims 1-26 and 33-60 are pending in this application. Claims 6-10, 33, 38, 39, 41, 44, 45, 48, 51, 52 and 54-60 are withdrawn from consideration. Applicants respectfully request that withdrawn dependent claims be rejoined with the independent claim from which they depend upon allowance of the independent claim. No claims have been amended, cancelled or added.

II. The § 112 Rejections Should Be Withdrawn

Claims 1-5, 11-26, 34-37, 40, 42, 43, 46, 47, 49, 50 and 53 are rejected under § 112, ¶ 2 as being indefinite. This rejection is respectfully traversed.

A. Preambles

The preamble of claims 1, 37, 47 and 53 was objected to because it recited a detector while the body of some of claims 1, 37 and 47 also recites a detector. Applicants note that the preamble of the claims recites a "molecular detector". This molecular detector includes the detector recited in the body of some claims plus additional elements recited in the claims. For example, the molecular detector recited in the preamble of claim 1 comprises the solution reservoir, the resonator and the detector in signal communication with the resonator. This is explained on page 8, first full paragraph of the specification. Thus, the detector recited in the body of claim 1 comprises a part of the molecular detector recited in the preamble of clam 1.

B. Claim 5

Claim 5 was rejected because it was unclear if the ligand recited in claim 5 was the same as the molecules being detected in claim 1. Applicants submit that the ligand of claim 5 is not the same as the same as the "molecules being detected" in claim 1.

Claim 5 is directed to the embodiment described on pages 9-10 of the specification. As shown in Figure 3A and 3B, for example, the resonator 16 can be functionalized with a receptor 26'', as recited in claim 4. An adjacent substrate 28 can be functionalized with a ligand 26', as recited in claim 5. As noted on page 9, last full paragraph of the specification, this configuration is designed to assay to the presence in the solution of free receptor or free ligand or for molecules which stabilize or compete with the interaction between the ligand 26' and receptor 26". Thus, for example, if the solution does not contain a free receptor or a free ligand or molecules which stabilize or compete with the interaction between the ligand 26' and receptor 26", then the ligand 26' and receptor 26" will bind to each other and tether the resonator to the substrate. This will affect the oscillation of the resonator one way.

In contrast, if solution does contain a free receptor or a free ligand or molecules which stabilize or compete with the interaction between the ligand 26' and receptor 26", then the free ligand, free receptor, or molecules will bind to the ligand 26' or the receptor 26". This will prevent the ligand 26' and the receptor 26" from binding to each other and will prevent the resonator from being tethered to the substrate. This will affect the oscillation of the resonator in a different way. Thus, the presence of a free receptor or a free ligand or molecules which stabilize or compete with the interaction between the ligand 26' and receptor 26 in the solution can be detected.

Therefore, with regard to claim 5, the molecular binding event recited in claim 1 includes binding of the ligand of claim 5 on the substrate of claim 5, or the receptor of claim 4 on the resonator of claim 4 with at least one of: i) a free receptor; or ii) a free ligand or iii) molecules which stabilize or compete with the interaction between the ligand on the substrate and receptor on the resonator. Thus, the presence in the solution of the i) a free receptor; or

ii) a free ligand; or iii) molecules which stabilize or compete are the "molecules being detected" in claim 5, not the ligand on the substrate which is recited in claim 5.

C. "Nanometer-scale"

The term "nanometer-scale" was found indefinite. The term nanometer-scale means a resonator which has at least one nanoscale dimension (i.e., a dimension or 1 micron or less). However, the resonator may have other dimensions that are microscale (i.e., greater than 1 micron). For example, claim 17 recites that the resonator has a thickness between about 10 nm and 1μm, a width between about 10nm and 1μm, and a length between about 1μm and 10 μm. In this case, the thickness and width of the resonator are 1 micron or less, rendering the resonator "nanometer-scale". Table I on page 9 of the specification provides other exemplary dimensions of nanometer-scale resonators.

D. Claim 37

The term "substrate or second resonator" was found indefinite. Claim 37 recites a molecular detector which contains either a substrate or a second resonator disposed within the reservoir. Thus, the substrate is not the same element as the second resonator. In other words, these terms are recited in the alternative and the claim can be limited to either one of these terms. However, the substrate and the second resonator in claim 37 can be used to perform the same recited function of claim 37. The exemplary molecular detector with a substrate 28 is illustrated in Figures 3A and 3B, while a different exemplary molecular detector with a second resonator (16 or 16b) is illustrated in Figures 3D, 3E and 3F.

Thus, applicants submit that for the above reasons, the pending claims are not indefinite and satisfy § 112, ¶ 2.

III. Prior Art Rejections Should Be Withdrawn

A. 102(e) Rejection Over Weitekamp

Claims 1, 2, 4, 5, 11, 12, 15, 23, 25, 26, 34, 37, 40, 42, 43, 46, 47, 50 and 53 are rejected under § 102(e) as being anticipated by Weitekamp. This rejection is respectfully traversed.

Independent claims 1, 37, 47 and 53 each recite a solution reservoir and a resonator disposed in the solution reservoir. Weitekamp does not teach or suggest this limitation.

A solution reservoir is a receptacle for storing a fluid. For example, it can comprise a walled vessel which contains a hollow space between the wall(s). The hollow space contains the resonator. The hollow space is adapted to hold a liquid solution.

The Office Action equates the sample holder 112 in Figure 1 of Weitekamp with the claimed solution reservoir. Applicants respectfully disagree. Weitekamp does not teach or suggest that the sample holder 112 is a solution reservoir. In fact, the sample holder 112 shown schematically in Figure 1 of Weitekamp appears to be a flat XYZ scanner or stage 312 shown in Figure 3 (see also col. 14, lines 48-54 of Weitekamp which explains this in more detail). The XYZ stage type of sample holder is not a solution reservoir. It is usually a movable stage which is located in a vacuum chamber. However, the sample holder 112 is not used to hold a solution in the system of Weitekamp. Therefore, Weitekamp does not anticipate independent claims 1, 37, 47 and 53 because Weitekamp does not teach every limitation of these claims.

B. 103(a) Rejection Over Weitekamp

Claims 17-22 and 35 have been rejected under § 103(a) as being obvious over Weitekamp. Claims 3, 13, 14, 16, 24, 36 and 49 have been rejected under § 103(a) as being obvious over Weitekamp in view of various secondary references.

These rejections are respectfully traversed because Weitekamp cannot be used as prior art in a §103(a) rejection. Specifically, 35 U.S.C. §103(c) prohibits the use of Weitekamp in a §103(a) rejection.

35 U.S.C. 103(c) states:

> c) Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Weitekamp and the present application as both assigned to the same assignee, California Institute of Technology. Weitekamp is only available as prior art under 35 U.S.C. 102(e) by virtue of its earlier filing date than the present application.

Therefore, Weitekamp cannot be used in a §103(a) rejection because Weitekamp is only available as prior art under §102(e) and because both Weitekamp and the present application were, at the time the claimed invention was made, subject to an obligation of assignment to the same assignee, California Institute of Technology, as provided in 35 U.S.C. §103(c). Since Weitekamp cannot be used in the §103(a) rejections, applicants respectfully request that the rejections be withdrawn.

Thus, dependent claims 3, 13, 14, 16-22, 24, 35, 36 and 49 are separately patentable over Weitekamp. Applicants reserve the right to rewrite these claims in independent form in a subsequent amendment.

C. Rejection Over The Ilic & Czaplewski Article

Claims 1-4, 11-13, 15-17, 23, 25, 26, 34, 35, 36 and 53 are rejected over the article by B. Ilic, D. Czaplewski et al., Applied Physics Letters (77) (2000) 450 ("Ilic")[1] in view of Thundat.

[1] This reference is called "Czaplewski" in the Office Action.

Claim 1 recites a detector in signal communication with the at least one resonator for measuring a damping of resonance motion of the resonator in response to a molecular binding event on the resonator. Claim 53 recites a similar limitation in means plus function format of section 112, paragraph 6. [2]

Ilic does not teach or suggest at least one resonator for measuring a damping of resonance motion. Specifically, Ilic teaches to neglect damping in the measurement of resonant frequency.

Ilic states on page 450, first column, last line to the fifth line of the second column that:

> In general, neglecting damping and assuming flexural rigidity ... the resonant frequency of the oscillator can be approximated from the following general equation of the transverse mechanical vibration: ... (emphasis added).

---

[2] In order to establish a *prima facie* case of unpatentability of a claim containing a section 112 paragraph 6 means plus function element, the examiner must find a prior art element that actually performs the claimed function; it is not enough that the prior art's structure is capable of performing the claimed function when the prior art specifically teaches against performing such a function. *See* MPEP 2183. For example, the predecessor court to the Federal Circuit stated:

> We cannot agree with the board that the [means plus function] claims "merely recite 'a means'." They recite a means plus a function which is not to be found in Leutwyler [the prior art reference]. They therefore do not read on that reference and are not anticipated thereby.

In re Mott, 194 USPQ 305, 307 (CCPA 1977). The Federal Circuit cited *In re Mott* with approval in *RCA Corp. v. Applied Digital Data Systems, Inc.*, 221 USPQ 385 (Fed. Cir. 1984). On page 389, footnote 5, the court stated

> The claims here define the invention in terms of specific "means-plus-function" elements. The limitations which must be met by an anticipatory reference are those set forth in each statement of function. In re Mott, 557 F.2d 266, 269, 194 USPQ 305, 307 (CCPA 1977). Such a limitation cannot be met by an element in a reference that performs a different function, even though it may be part of a device embodying the same general overall concept. [Emphasis added].

Therefore, Ilic only teaches to measure the resonant frequency of the oscillator, but does not teach or suggest measuring damping of resonance motion[3]. Ilic cannot be measuring damping if damping is neglected in the calculation of resonant frequency!

Thundat was relied upon only for the teaching of resonator dimensions. As pointed out in the response to the first Office Action, Thundat also does teach or suggest measuring damping of resonance motion. Thus, even if Ilic and Thundat are combined, the combination would not teach or suggest every limitation of independent claims 1 and 53. Applicants respectfully request that all rejections be withdrawn.

IV. Conclusion

Applicants submit that the application is now in condition for allowance. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

---

[3] As explained in detail during the personal interview and in the response to first office action, measurement of the resonance frequency is in effect a measurement of the inverse distance between the peaks in a plot of vibration amplitude versus time. The measurement of resonance frequency is not an inherent detection of damping of claims 1 and 53. For example, detection of damping involves measurement of the decay of vibration amplitude versus time.

Respectfully submitted,

Date 5/8/06

By _____

FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5300
Facsimile: (202) 672-5399

Leon Radomsky
Attorney for Applicant
Registration No. 43,445